

NOTES ON THE BIRDS OF THE SIKKIM HIMALAYAS.

By

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(With a Map and Plate I.)

INTRODUCTION.

The Sikkim Himalaya is a compact portion of this enormous mountain range within the limits of latitude $26^{\circ} 40'$ to 28° N., and longitude 88° to 89° E. The whole extent of country represented is a wedge-shaped area, roughly circumscribed to the east by the Cho La Range from Tibet to Bhotan, and on the west by the Singile La Range from Nepal, with a length of 90 miles by 50 miles breadth, in average, representing some 4,500 square miles, and for comparison equivalent to about three-fifths the size of Wales* Within these confines is the District of Darjeeling in the Bengal Presidency with its northern frontier adjoining Sikkim and comprising an area of 1,664 square miles, inclusive of the plains tract which is strictly beyond this sphere. Various terms have been employed in the designation of portions of this country, viz., Native Sikkim, in the vernacular, Sukhim, otherwise the Independent State of Sikkim.† British Sikkim, as was formerly applied to the range on which stand the hill stations of Darjeeling and Kurseong, together with the contributory spurs originally leased in 1835, but later, with the acquisition of the Southern extremity of the Singile La Range in 1850, had reference to what now constitutes the elevated portion, in contradistinction to the plains of the Darjeeling District, with the exception of what was formerly known as British Bhotan (Daling) annexed in 1864-65, and is now the Sub-Division of Kalimpong. Thus it can be readily understood, how necessary it is to avoid all ambiguous terms in reference to localities and to fix at least the approximate elevations, since even in the district of Darjeeling, there is a difference in altitude of from 300 feet (plains level,) up to Sandakphu at 11,923 feet. The dissimilarities in the physical features of this area exist to a greater degree over the whole country which consists of one extensive complex system of mountains and valleys. In view of these facts I have chosen this term, correctly Sikkim Himalaya, as employed by Hooker, and applicable to this composite territory.

This paper may be regarded as supplementary to my "Notes on the Birds of Upper Assam", Jour. Bom. Nat. Hist. Soc., Vol. XXIII. I have not hesitated to make use of information obtained in outlying parts, as will be noticed; all of which records have a bearing on the subject. It is mainly written from the standpoint of what is now understood as the *Zonal Distribution*, which is an important factor in the fauna and interdependent flora of the two Zoological Regions. It covers my first visit to the hills, March 1911, when elevations of from 2,000'-6,000' were worked during a stay of twelve days. December 1911 to June 1912, 3,500'-12,000', a period of twenty-three weeks, of which time from the 20th of January to the 25th of May, my head-quarters were at 10,000'-12,000'. From January 1914, with the exception of a three months' residence at 2,050' when observations were limited between 950'-2,600' my eight years' residence at an elevation of 4,720', with an altitudinal range of some 2,600' odd feet from 3,440'-6,100' has supplied the bulk of the records, augmented by every available period of short leave, which has enabled me to widen operations during the winter, when several excursions attaining elevations around 10,000' have been undertaken into the interior, this being the time when the majority of the birds of the higher limits are then below the prevalent snow-line.

* The size of Wales is 7,362 square miles.

† There is no authoritative rendering of this name denoted by either *Sikhim* or *Sikkim*. The latter is most frequently employed and agrees best with Government usage.

These records complete over twenty years' acquaintance with the avi-fauna of the Eastern Himalayas. Full use has been made of information supplied to me by Mr. G. E. Shaw, B.Sc., who also has the advantage of a residential knowledge of a part of the country which presents a marked diversity in the distribution of many species in comparison with my surroundings.

His ornithological pursuits extend over many years. Without the inclusion of his records, these notes would have been incomplete. Where my fellow-planters have assisted me with specimens, acknowledgment is given in the text. My indebtedness is due to Sir Charles A. Bell, K.C.I.E., C.M.G., I.C.S., for, during his regime as Political Officer, granting me facilities to collect in the Independent State of H. H. The Maharajah of Sikkim.

The extraordinary wealth of insect and bird-life is nowhere more exemplified than in this wonderful zoological country, so much so that the great Dr. Alfred Russel Wallace refers to the Himalayan sub-region as perhaps one of the richest tracts of equal extent on the face of the globe.

The list of birds enumerated totals some 549 species and sub-species, and takes scant cognizance of the innumerable waders and ducks, the majority of which pass over as fleeting passage migrants. The Passeres alone number 365 and, as a further instructive example in support of this richness, one 250 acre block of forest has yielded a total of 172 forms with every possibility of an additional dozen or so being added to this number, whilst the surroundings within a radius of one mile have accounted for a supplementary 51 forms. The abundance of bird-life in this particular instance was the result of a favourable situation on a spur, with a northerly and southerly trend within an altitudinal range of from 4,700 feet to over 6,000 feet, whose upper limits extended to meet the Government Reserve. The land at the other extremity and in Nepal being under cultivation or rudely devastated of its natural vegetation has made this area in consequence a perfect "oasis" for the resident birds, in addition attracting the upward breeding migrants and those to and from higher altitudes, as well as stragglers driven down under stress of weather or owing to scarcity of food. The abundance of bird-life in this locality is obvious from a perusal of the following pages. Wherever private enterprise has safe-guarded its interests by conserving even a tittle of the indigenous forest this has all been in favour of the birds, and can well be appreciated by all true lovers of nature's marvellous and bounteous gifts. Where no check has been kept on the primitive methods of land devastation in vogue the ultimate issue has been disastrous in many respects.

Since the first volume of Oates' "Fauna" was published in 1889, our knowledge has advanced on several basis, excepting in regard to Pterylosis, *i.e.*, the study of the distribution of the feather tracts in nestling birds, a branch of Ornithology whose advancement is dependent entirely on the raw material supplied to the systematist by the naturalist in the field, on whose efforts the systematist must also rely for data as regards migration and habits of species—aspects of bird-life whose study has hitherto been sadly neglected. The difficulties attendant on a close study of any of these problems, often under trying circumstances in a tropical climate, ought to be only too apparent, but unfortunately can only be rightly appreciated through actual experience, and can only be overcome by an increase in the ranks of observers with the necessary opportunity and leisure. Nevertheless, progress has been made in the fascinating study of distribution. In gauging the extent to which our present knowledge of the distribution of species is at variance with former records, due regard must be given to the fact that, in the period of time which has elapsed, conditions were not so advantageous for definitely fixing the exact locality and elevation at which species were found, as is necessitated by modern requirements. It must also be remembered that some species have increased and decreased according to whether conditions were favourable or otherwise in areas hitherto frequented by them, for, intensely conservative as birds are, changes in the natural features

of the country through man's agency must have produced its effect on the distribution of species. A botanical survey would assuredly reveal a decreased area under forest, while, to go to a greater extreme, specific vegetation which was familiar to Sir Joseph Hooker in his profound knowledge, is no doubt in many instances now relegated to more restricted or remote localities.

CLIMATE.

A humid climate, extending over more than half of the year, has resulted in a luxuriant vegetation. This is the effect not only of the S. W. monsoon which lasts from May to October, the heaviest rainfall generally taking place during the four intervening months, but also of local rain which is more in evidence before the advent of the monsoon, so that in some years, with the exception of an excessive downpour, there is no tangible indication to denote the actual commencement of "the rains", which are correspondingly prolonged. Whilst the opposing face of the outlying spurs receives the full impact of the deluge, with the consequent result the wettest tract is at the base of the hills, characteristics in the configuration of the physical features cause much disparity in the rainfall which is far from being equally distributed, as for example: Kurseong 154 inches, Darjeeling 120, Gopaldhara 108, Pashok 66. As a short distance around any of these places would give results in excess or in deficit of these figures, it is obvious conditions in the valleys vary in the same respect according to the neighbouring protection, exposure, and slope of the ridges. This never-failing rain exerts its influence on the flora, subject to these several natural peculiarities, which directly affects the fauna. It is during this period of greatest activity in nature, when all insect life is at its zenith, that the majority of the birds perform their duties of procreation, which is none the less remarkable when this heavy rainfall is taken into consideration.

Zoo-Geography.—The exact demarcation of the limits of the Palæarctic and Oriental Regions will remain a matter for modified speculation even with the increase of our knowledge. In deciding on any definite line of division nowhere can this difficulty be more evident than in a country which presents such a diversity in its physical features. Irregularities are bound to occur relative to the varying altitudes of the vegetation, which again is dependent on local peculiarities of soil, aspect and shelter, and this is actually the case, but more strikingly apparent, in the interior, where in the deep narrow valleys the tropical vegetation meets the lowest belt of the temperate flora. Whilst the existence of this division has long since been recognized, opinions may be at variance as to the exact delineation of this divisional line, which can only be considered decisive by a complete zoological survey along the contour of the mountains when the perplexities connected with the presence or absence of forms could be satisfactorily eliminated and, if necessary, the required divergences established.

In view of any misunderstanding which may still be prevalent, it is as well to bear in mind the following statement * which holds as good to-day as when it was originally penned.

"Which class of Animals is of most importance in determining Zoological Regions?—To decide this question we have to consider which groups of animals are best adapted to exhibit, by their existing distribution, the past changes and present physical condition of the earth's surface; and at the same time, by the abundance of their remains in the various tertiary formations will best enable us to trace out the more recent of the series of changes, both of the earth's surface and its inhabitants by which the present state of things has been brought about. For this purpose we require a group which shall be dependent for its means of dispersal on the distribution of land and water, and

* "The Geographical Distribution of Animals" by A. R. Wallace, 1876. Vol. I, pages 56-58.

on the presence or absence of lofty mountains, desert plains or plateaux, and great forests; since these are the chief physical features of the earth's surface whose modifications at successive periods we wish to discover. It is also essential that they should not be subject to dispersal by many accidental causes; as this would inevitably in time tend to obliterate the effect of natural barriers, and produce a scattered distribution, the causes of which we could only guess at. Again it is necessary that they should be so highly organized as not to be absolutely dependent on other groups of animals and with so much power of adaptation as to be able to exist in one form or another over the whole globe. And lastly, it is highly important that the whole group should be pretty well known, and that a fairly natural classification, especially of its minor divisions such as families and genera, should have been arrived at; the reason for which last proviso is explained in our next chapter on classification."

"Now in every one of these points the mammalia are pre-eminent; and they possess the additional advantage of being the most highly developed class of organized beings, and that to which we ourselves belong. We should therefore construct our typical or standard zoological regions in the first place from a consideration of the distribution of mammalia, only bringing to our aid the distribution of other groups to determine doubtful points. Regions so established will be most closely in accordance with those long-enduring features of physical geography, on which the distribution of all forms of life fundamentally depend; and all discrepancies in the distribution of other classes of animals must be capable of being explained, either by their exceptional means of dispersion or by special conditions affecting their perpetuation and increase in each locality."

"If these considerations are well founded, the objections of those who study insects or molluscs, for example,—that our regions are not true for their departments of nature—cannot be maintained. For they will find, that a careful consideration of the exceptional means of dispersal and conditions of existence of each group, will explain most of the divergences from the normal distribution of higher animals."

"We shall thus be led to an intelligent comprehension of the phenomena of distribution in all groups, which would not be the case if every specialist formed regions for his own particular study. In many cases we should find that no satisfactory division of the earth could be made to correspond with the distribution of even an entire class: but we should have the coleopterist and the lepidopterist each with his own geography. And even this would probably not suffice, for it is very doubtful if the detailed distribution of the Longicornes, so closely dependent on woody vegetation, could be made to agree with that of the Staphylinidæ or the Carabidæ which abound in many of the most barren regions, or with that of the Scarabeidæ, largely dependent on the presence of herbivorous mammalia. And when each of these enquirers had settled a division of the earth into 'regions' which exhibited with tolerable accuracy the phenomena of distribution of his own group, we should have gained nothing whatever but a very complex mode of exhibiting the bare facts of distribution. We should then have to begin to work out the causes of the divergence of one group from another in this respect; but as each worker would refer to his own set of regions as the type, the whole subject would become involved in inextricable confusion. These considerations seem to make it imperative that one set of "regions" should be established as typical for zoology; and it is hoped the reasons here advanced will satisfy most naturalists that these regions can best be determined, in the first place, by a study of the distribution of the mammalia supplemented in doubtful cases by that of the other vertebrates." Again Wallace writes:—

"I had accepted and supported Dr. P. L. Sclater's division of the earth's surface into six great zoological regions, founded upon a detailed examination

of the distribution of birds, but equally applicable to mammalia, reptiles, and several other great divisions, and best serving to illustrate and explain the diversities and apparent contradictions in the distribution of all land animals; and I may now add that the additional facts accumulated and the various divisions suggested during the thirty years that have since elapsed, have not in the least altered my opinions on this matter."

"No one is more aware than myself of the defects of the work, a considerable portion of which are due to the fact that it was written a quarter of a century too soon—at a time when both zoological and palæontological discovery were advancing with great rapidity, while new and improved classifications of some of the great classes and orders were in constant progress. But though many of the details given in these volumes would now require alteration, there is no reason to believe that the great features of the work and general principles established by it will require any important modification.*"

In the treatment of each species separately, stress has been made, in particular instances, of species belonging to Oriental genera having a Palearctic zonal distribution. Amongst these may be considered, as having a breeding range in satisfactory proof of this contention, the following and, though others might well be included, the undermentioned species fall into this category with a certainty, and thus serve our purpose to the best advantage:—

Hodgson's Fulvetta—*Fulvetta vinipecta vinipecta*.

The Hoary Bar-wing—*Ixops nipalensis nipalensis*.

„ Stripe-throated Yuhina—*Yuhina gularis gularis*.

„ Slaty-headed Yuhina—*Yuhina occipitalis occipitalis*.

„ Green Shrike-Babbler—*Pteruthius xanthochloris xanthochloris*.

to these must be added species not of migratory habits, yet which might be regarded in some quarters as doubtful Palearctic genera:—

The Rufous-fronted Tit—*Ægithaliscus iouschistos*.

† „ Great Parrot-Bill—*Conostoma œmodius*.

† „ Brown Suthora—*Suthora unicolor*.

† „ Fulvous-fronted Suthora—*Suthora fulvifrons fulvifrons*

„ Black-faced Laughing-Thrush—*Trochalopteryx affinis affinis*.

„ Rufous-bellied Pied Woodpecker—*Dryobates hyperythrus hyperythrus*.

* "My Life", 1905, Vol. II, pages 94 & 98, A. R. Wallace.

† Blanford in his "Notes on the Zoology of the Alpine and Sub-Alpine Regions" states: "Only those species will be noticed which are found above the limit of trees, and consequently no animals will as a rule be mentioned which are not found above 10,000 feet in Northern Sikkim. This elevation, which is about the lower limit of pines, is also a fair approximation to a boundary line between the two faunas which meet in the Eastern Himalayas, the Malay and the Palearctic" and in reference to *Conostoma œmodius* and *Suthora unicolor* he remarks "Perhaps neither of the last two birds should have been comprised as neither was found above the lowest limit of the pines." Attention has previously been drawn to Blanford's remarks in regard to the demarcation of the two faunas in the Lachung Valley where, at an elevation of 8,000 feet, the south-east slopes of the mountains above Kedom are clothed with the *Abies trunoniana* (Hooker), while at an elevation of 8,300 feet one of the spruce *Abies smithiana* according to the same authority, occurs in the adjoining Lachen Valley in Northern Sikkim.

Crow-Tits and Suthoras which are just as dependent on reed and bamboo-growth as Nutcrackers, Crossbills, &c., &c; are generally considered as occurring exclusively in the pine forests. An extensive tract of matted, dense, impenetrable bamboos is, equally with the superb rhododendron and other stately trees, quite as marked a feature in the vegetation as the pine forests are above. With one exception these birds have this distinct habitat, in respect to which their existence is vital. These peculiar specialized forms are now recognized as belonging to the Palearctic avi-fauna, and there appears every justification for this inclusion; the presence of *Paradoxornis* at lower levels must be explained by the law of dispersal and these conditions of existence.

The Darjeeling Pied Woodpecker—*Dryobates darjellensis*.
and finally the bulk of the purely Palæarctic species belonging to undoubted Palæarctic genera, such as

- The Himalayan Nutcracker—*Nucifraga hemispila*.
- „ Himalayan Cole-Tit—*Lophophanes ater æmodius*.
- „ Sikkim Black-Tit—*Lophophanes rufonuchalis beavani*.
- „ Brown Crested-Tit—*Lophophanes dichrous dichrous*.
- „ Nepal Tree-Creeper—*Certhia familiaris nipalensis*.
- „ Nepal Wren—*Troglodytes nipalensis nipalensis*.
- „ Himalayan Goldcrest—*Regulus regulus himalayensis*.

and as a representative of the Phasianidæ:—

The Monál—*Lophophorus impejanus* ;
apart from the members of such genera as *Pyrrhocorax*, *Phœnicurus*, *Calliope*, *Laiscopus*, *Prunella*, *Perissospiza*, *Pyrrhula*, *Loxia*, *Carpodacus*, *Procarduelis*, *Grandala*, *Columba*, *Ithagenes*, &c., &c. ; the majority of which breed at extreme heights in the Himalayas, though the Finches are noted vagrants. I have only taken into consideration the abovementioned non-migratory species as being typical of birds, none of which probably breed below, but at and above the limit of 8,500 feet along the contour of the mountains encircling the main river basin, and as a sufficient illustration for the purpose in defining this division.

The arbitrary boundary between the two zoological regions in the Himalayas has been regarded as following a course at a fixed altitude, and is stated to occur at more or less indefinite limits from 6,000 feet upwards, yet is relative to the vegetation and bears a close connection with the lowest limits of the coniferous forests, and is in reality a belt below the Pines. It is generally conceded that deciduous forests are singularly deficient in bird-life, “except on the outskirts,”—a scarcity which is a common feature of the pine forests and is substantiated in the numerous instances cited. At whatever elevation the change in the fauna takes place in the N. W. Himalayas, (which is apparently at much lower limits than this definition, and can be accounted for by the lower altitude at which the coniferæ are to be met with) it is certainly not the case in the Sikkim Himalayas, excepting in the valleys of the interior, when, as in the Lachung Valley, a drop in elevation of 2,000 feet results in a distinct separation of the two faunas at 6,500 feet.

“The rarity of Pines is perhaps the most curious feature in the botany of Tonglo, and on the outer ranges of Sikkim ; for between the level of 2,500 feet (the upper limit of *P. longifolia*) and 10,000 feet that of the *Taxus*, there is no coniferous tree whatever in Southern Sikkim.” (“Himalayan Journals,” page 117, J. D. Hooker.)

It will be noted from an examination of the map ; the valleys of the Talung and Ratong have been left open, as information is to some extent meagre as to the exact determination of the dividing line. The first named valley would amply repay working zoologically, but, judging from what we already know of the limits of the tropical vegetation in these valleys, there would almost certainly be found a corresponding marked division in the fauna at a similar altitude as prevails to the north-east having regard also to the close proximity of the snow line. Sir J. D. Hooker makes repeated reference to this phenomenon. Referring to the Ratong Valley from a point south-east of Jongri, he writes:—

“The view to the southward from Mon Lepcha, including the country between the sea-like plains of India and the loftiest mountain on the globe, is very grand, and neither wanting in variety nor in beauty. From the deep valleys choked with tropical luxuriance to the scanty yak pasturage on the heights above, seems but a step at the first ‘coup-d’œil,’ but resolves itself on a closer inspection into five belts : 1, palm and plantain ; 2, oak and laurel ; 3, pine ; 4 rhododendron



H. S. Photo.

LACHUNG VALLEY.

Track to Yumthang, four miles north of Lachung, looking north. 7th March, 1920.
"Pine forests devoid of bird-life in winter."



H. S. Photo.

A VISTA OF KEDOM VILLAGE, LACHUNG VALLEY.

11th March, 1920. Elevation 6,500'. The demarcation of the Flora and Fauna of the two Regions is hereabouts strikingly exhibited.

and grass; and 5, rock and snow. From the bed of the Ratong, in which grow palms with screw-pine and plantain, it is only seven miles in a direct line to the perpetual ice. From the plains of India, or outer Himalaya, one may behold snowy peaks rise in the distance behind a foreground of tropical forest; here, on the contrary, all the intermediate phases of vegetation are seen at a glance. Except in the Himalaya this is no common phenomenon, and is owing to the very remarkable depth of the river-beds. That part of the valley of the Ratong where tropical vegetation ceases, is but 4,000 feet above the sea, and though fully fifty miles as the crow flies (and perhaps 200 by the windings of the river) from the plains of India, is only eight in a straight line (and forty by the windings) from the snows which feed that river. In other words the descent is so rapid, that in eight miles the Ratong waters every variety of vegetation, from the lichen of the poles to the palm of the tropics; whilst throughout the remainder of its mountain course, it falls from 4,000 to 300 feet, flowing amongst tropical scenery, through a valley whose flanks rise from 5,000 to 12,000 feet above its bed." (Page 244, and further in reference to the Lachen Valley.)

"Again, the Lachen Valley at this spot is nearly equi-distant from the tropical forests of the Terai and the sterile mountains of Tibet, for which reason representatives both of the dry central Asiatic and Siberian, and of the humid Malayan floras meet there." (Page 313.)

"At first sight it appears incredible that such a limited area, buried in the depths of the Himalaya, should present nearly all the types of the flora of the north temperate zone; not only, however, is this the case, but space is also found at Lamteng for the intercalation of types of a Malayan flora, otherwise wholly foreign to the north temperate region." ("Himalayan Journals," page 314, J. D. Hooker.)

Blanford mentions the lowest limit of the Pines at 500 feet below the village of Lamteng (Lachen) in this valley. The elevation of Lachen is identical with Lachung, 8,800 feet, but the gradient in general of the valley at its lower extremity is less pronounced in comparison to the Lachung Valley.

This line of demarcation isolates three small areas, of which Senchal, the farthest south, affords the severest test. Where the indigenous forest has undergone a certain amount of depletion, to form a correct estimate from this source, however, what formerly existed is fortunately recorded by Hooker; yet the presence of the Red Cat-bear, *Ailurus fulgens*, and the dispersal to much lower limits in the adjacent valleys of typical Palæartic mammals such as the Tibetan Water-Shrew, *Nectogale sikhimensis*, and the Short-tailed Mole, *Talpa micrura*, (though the last named species has not reached quite the extreme limits of its distribution as it occurs in the plains of Upper Assam and is more common from 3,500 feet upwards in the valleys on the west, which, again, support a Pangolin, *Manis pentadactyla*, evidently not to be met with to the immediate east yet which occurs beyond) are anomalies only to be expected. * Whilst the prevalence in the surroundings during the summer months of such birds as the Brown Suthora *Suthora unicolor*, Hodgson's Fulvetta, *Fulvetta vinipecta*, the Nepal Tree-Creeper, *Certhia familiaris nipalensis*, the Darjeeling Pied Woodpecker, *Dryobates darjellensis*, with the addition of others as for instance, the Sikkim Jay, *Garrulus bispecularis interstinctus*, the Rufous-bellied Shrike-Tit, *Hilarocichla rufiventer*, the Brown Bullfinch, *Pyrrhula nipalensis nipalensis*, and several species which some authorities would, perhaps rightly, have no compunction in including as representing the Palæartic avifauna, go to prove the correctness of this delineation, which even a strong intermingling of Oriental genera cannot be brought forward to refute; yet

* For further information respecting the distribution of the mammalian fauna, consult: R. C., Wroughton, B.N.H.S. Journal, Vol. XXIV, pp. 473, 474.

some allowance ought to be made for conditions which do not adversely affect to the same extent Tendong to the north.

This attempt may appear to favour of sheer presumption with the numerous difficulties to which attention has been drawn. I crave leniency on the score of "nothing attempted, nothing done" and the labour involved might well have been shirked for other pursuits during my home leave. It rests, however, on a firm basis as, in addition to results obtained from a study of the birds, intensive collecting of the invertebrates has been undertaken by me and I have also had assistance from others and even if many years must elapse before a final conclusion can be drawn from an examination of such a vast amount of material still sufficient evidence has been forthcoming for a satisfactory dividing line, which in places may only be approximately defined but is strikingly apparent in some quarters. Up to the present, so far as I am aware, no endeavour has been made to define the limits of the two regions in the North-West: a portion of the Himalayas which must be sufficiently well known. If some enthusiast would undertake the task, the generally accepted (straight line) running through this vast range of mountains and innumerable valleys without any regard to the physical features of the country through which it passes, might also show some extraordinary divergences.

As our knowledge is increased of the intervening area, the demarcation of the Oriental fauna in the Eastern and Western sub regions may not seem an insuperable difficulty as it is at present.

The distribution limits of some species can only be considered provisional and may require modification as years elapse. My opinions are expressed in good faith with no intention of dogmatizing but in the hope that they may be the means of elucidating the correct solution.

Note.—On the completion of these records, Mr. N. B. Kinnear has drawn my attention to an important article which previously was only known to me from references and I am again indebted to Lord Rothschild for the privilege of the use of the Tring Museum Library. The following extracts and remarks anent distribution of species are inserted here, as the former refer to an identical part of the country from which my conclusions were formed, and the latter have been embodied in this paper with a view to completeness as far as it is possible.

"Account of a visit to the Eastern and Northern Frontiers of Independent Sikkim." Pt. I General Account; Jour. As. Soc. Bengal, Vol. XL, 1871, page 367. Pt. II. Zoology; *Ibid.* Vol. XLI, 1872, page, 30. Dr. W. T. Blanford.

"1870, September 6th.—We marched from Chungtam to Kedam, a short march up the Lachung Valley but involving a considerable ascent, from 5,200 to 6,600 feet. There is a very marked change about this in the fauna and flora. As far as Chungtam the common birds are the usual Sikkim form but at Kedam we found flocks of the Himalayan Siskin, *Chrysomitris spinoides*, and a Titlark, *Corydalla striolata*, abounded in all open spaces. Indeed this may be considered the boundary between the Malay and Palearctic faunas, a boundary which, on the Chola range, is 3,000 to 4,000 feet higher." (Page 394.)

"15th-20th.—On the 17th we marched down the Tista valley to Tarco on the northern flank of Mount Tendong," "and on the following day we crossed Tendong by a road which goes over the top of the mountain and descended to Namchi, opposite Darjeeling. The change in the fauna in coming southward is very marked, the number of forms increases, and there is a far greater prevalence of Malay types on the outer hills as compared with the upper Tista valley" (Page 420.)

"These elevations and all subsequently mentioned are taken from Hooker's 'Himalayan Journals.' (Blanford.)"

MIGRATION.

Of the actual movement of the Passerine migrants little can be said; there can be no doubt that in the hills the majority straggle through the valleys in scattered parties or even as individuals. No observer seems to have been fortunate enough to come across a concourse of one species or a mixed assembly on migration. Whether some of the Passerine migrants which perform lengthy journeys pass over at extreme heights during the night has probably not been substantiated by any direct evidence, however this is undoubtedly the case with the waders and ducks. Though there appears to be no well marked migration route through the country the terrific heights of the snowy ranges do not form an insurmountable barrier to birds of comparatively weak flight, as the Mount Everest Expedition has disclosed. Some instances of migration have been recorded under the birds concerned.

VERNACULAR NAMES.

Contrary to what might be expected, the Paharia is not a close observer, confining his attention in particular to the various trees, bamboos, etc. as chiefly concerning his every-day wants. This trait seems to be developed in more primitive people for whereas the Lepcha has a name for each species of bird, the Paharia (which term refers to the hill men Limboos, Newars, Rais, etc. of the Darjeeling district, many of whom now have only remote ties of relationship with the same castes in Nepal) if he does recognize differences, is merely content in relegating birds of similar form and habits under one heading, as his bird vocabulary is very limited. Neither has the younger generation got the grasp of the subject, and the increase of often spurious knowledge, instead of sound common sense education, may have some thing to do with their losing touch with nature. It is unfortunate so few names in the vernacular appear in this list in consequence of this failing.

ACKNOWLEDGMENTS.

An examination of my material would not have been satisfactory without the opportunity to compare obscure and doubtful forms with the two standard collections at home. I am grateful to Lord Rothschild, F.R.S., for granting me access to the magnificent collection in the Tring Museum, and to Dr. E. Hartert and Mr. Arthur Goodson for all kindness and help. My thanks are due to the Authorities of the British Museum for the privilege of the use of the National Collection. I would especially mention Dr. P. R. Lowe, Mr. N. B. Kinnear and Mr. Thomas Wells, and I am under an obligation to Mr. W. S. Millard for his assistance in connection with the publication of this paper and this equally applies to the Editors in seeing it through the press.

As is to be expected the "Fauna" Volumes of Oates and Blanford have formed the grounds of all study. The time seems opportune to express even a belated appreciation of this work before our well worn and stained copies have been laid aside. May every success attend Mr. E. C. Stuart Baker in bringing his task to completion.* Dr. Hartert's "Die Vögel der Paläarktischen Fauna" treats of all the forms occurring in our area. The subject has never been so thoroughly tackled as in this monumental work, which has been freely consulted as also to a less extent "A Manual of Palæarctic Birds" (Dresser). The natural sequence followed is in accordance with Stuart Baker's Hand-List B.N.H.S., Vols. XXVII & XXVIII. References to other important treatises and articles are acknowledged in the text.

* With the appearance of the 1st Volume of the Second Edition of the "Avi-Fauna" a new era has opened for ornithologists in India and we can well congratulate the author.

The map is a section of the North-Eastern Trans-Frontier, Sheet No. 7. Scale 1 inch=8 miles. Some of the place-names do not agree with the current acceptance, but as it is principally a matter of phonetic spelling, the originals are sometimes more in accord with the local rendering, and it has not been considered advisable or necessary to make any alterations.* Whenever an omission existed, the required locality has been inserted to enable a reference from the text, as no up-to-date map exists, and the inclusion of several such place-names might lead to confusion by giving them undue importance on a map of the present scale, although, it is clear from the numerous omissions, that the tea districts had not reached their importance when this survey was undertaken. The black line represents the demarcation between the Palearctic and Oriental Regions which is the 8,500 feet contour of the mountain ranges encircling the basin of the Tista River—the main affluent in the country—and its tributaries, with a divergence and drop in elevation to 6,500 feet at the head of the valleys in the interior, the reasons for which are stated elsewhere. All place-names mentioned are underlined as are also Blanford's localities.

Altitudinal records have been obtained by aneroid takings and approximate elevations calculated from authentic heights.

An asterisk denotes an observation.

All measurements are in millimetres unless otherwise stated.

The length measurement of the bill is, in the absence of the other details, taken from the *true base*.

This method is liable to error as the true base is concealed by the feathers of the forehead, and is arrived at with some little difficulty; it requires careful accuracy and does not seem to be an improvement on the older method of the gape measurement.

An effective and preferable system is to measure from the anterior edge of the nostril to the tip of the bill.

Bill from feathers—Culmen measurement.

All tail measurements are from the commencement of the web, *i.e.*, minus the "quill proper", to the end of the longest feather.

Order—PASSERES.

FAMILY—CORVIDÆ.

1. The Himalayan Raven. *Corvus corax tibetanus* (Hodgs.).

Recorded for the Himalayas at altitudes, generally of above 13,000'-14,000' which apparently is applicable to its status in Sikkim. Evidently *confined to high altitudes of the remotest ranges*. In the regions beyond Sikkim probably occurs in the valleys in the winter within its distribution area, as is the case with a number of birds from extreme high limits. From the third week in January to the end of May 1912, at elevations of from 10,000'-12,000', on the Singile La Ridge during a severe winter, daily observations failed to yield a single occurrence. This prolonged experience is at variance with Beebe's in mid-April, *vide* his reference to this Raven in his field notes on *Ithagenes cruentus* and from the identical tract of country on the Nepal-Sikkim Frontier.

Around Karponang, at 9,500', during March 1917 when the surrounding country was deep in snow, not a sign of this bird was forthcoming; neither, during a fortnight's sojourn in February and March, 1920, at 8,800' and upwards beyond the winter snow-line in the Lachung Valley, did a rigorous search of the

* Wherever available, the P. O. designation is to be recommended.

The locality Darjeeling, in the absence of any other definite information, should be restricted to the environs of the station. Circum. 7,000 feet.

adjacent mountains produce a single clue to its whereabouts. Information supplied locally to the contrary, as to its frequenting the village during a rigorous winter, I could place no reliance on, as during my stay these conditions were fulfilled without any tangible evidence of its appearance. I have put this negative evidence on record as there is some misconception as to its status. With the Jungle-Crow occupying the wilder tracts of the country, casual observers are apt to confound the two; which is inexcusable if due cognizance is taken of the inequality in size; and it has been reported to me as having been seen, when the bird in question was undoubtedly the next species.

Blanford states Ravens were not seen below 14,000', above that were common both on the Cho La Range and in Northern Sikkim in the autumn of 1870 (18th, 19th September, Momay Samdong). During the Mt. Everest Expedition "observed up to 21,000'." Ibis, July 1922, pp. 495-526. "On The Birds collected by Mr. A. F. R. Wollaston during the First Mt. Everest Expedition." (N. B. Kinnear, M.B.O.U.)

2. The Himalayan Jungle-Crow. *Corvus coronoides intermedius* (Adams). "Kak", Paharia.

Recorded as *absent from the higher parts of the Himalayas*, which is *only correct for extreme limits* in the Sikkim Himalaya—Resident along the Nepal-Sikkim Frontier on the Singile La Ridge, possibly descending to lower limits on the approach of severe weather. During the winter a few pairs hung about the Sandakphu dak bungalow at 11,900', though they were extremely wary and only one specimen was secured, ♀ 28-2-12. Bill from skull 54, from nostril, 34; wing, 330.

Observed on several occasions when the whole ground was deep in snow. Tonglo, 10,074', 27-1-12, a single pair in the vicinity of the dak bungalow, having been hereabouts at all events for the last seven days.

Kalo Pokhari, 10,160, 28-3-12. On my return to camp this evening, I disturbed about forty Jungle-Crows in a patch of forest, mainly rhododendron trees, half a mile below the ridge on the slopes of the Mai ("Khola") Valley in Nepal; they were engaged arranging their domestic affairs and showed their disapproval of my intrusion into their presence by creating a noisy commotion: a clutch of four eggs was taken at this locality on the 27th April 1912. Sparingly nests around Gopaldhara; a clutch of four eggs taken on the 15th May 1912, and on the 24th April 1918, nest in one of the cryptomeria trees alongside the bungalow at 4,720'. Sometimes resorts for this purpose to a high bamboo-clump, when the nest is practically inaccessible. At Karponang was observed frequently at 9,500' in March 1917. Very common in the village of Lachung and surrounding country at 9,000' in February and March 1920. Numerous in the station of Darjeeling throughout the whole year.

It would be interesting to have evidence as to whether the Raven ever mingles with the Jungle-Crow at high altitudes or is entirely exclusive in its solitude. I surmise the bird which comes up to breed at "moderate elevations" will on examination prove to be *C. c. levaillanti*, Less.

Blanford states:—Crows were common up to about 13,000', above which elevation they seemed to be replaced by Ravens, they appeared far more abundant about 8,000' in the higher valleys than below that elevation; there were large flocks of them near most of the villages, but as usual with *C. vaillanti*? (*levaillanti*) in the autumn of 1870.

3. The Indian House-Crow. *Corvus splendens splendens* (Vieill).

More partial to the towns and villages but is distributed sparingly, if somewhat locally, over the whole area. *Occurs up to an elevation of 7,900'* at Jalapahar at all events, though only recorded as ascending the Himalayas to about 4,000'

(Oates, F. B. I., Vol. I.). Chiefly confined to low elevations and not much in evidence; they are however securely established in the station of Darjeeling and the surrounding countryside. Odd birds come up the Rungbong Valley in the cold weather, when they are to be seen around the bungalow at Gopaldhara, 4,720'. Numbers congregated on the Nagri Spur in late January 1919, evidently preparatory to pairing for the nesting season. Observed plentifully in Gangtok at 5,500' in March 1917. So far I have seen no breeding colonies in these hills but Dr. Scully records examining twenty nests on the 23rd June in the Nepal Valley, when half the number contained young birds.

4. The Black-rumped Magpie. *Pica pica bottanensis*
(Deless.).

Recorded from the higher parts of Bhotan, Native Sikkim and Chinese Tibet. The exact status of this Magpie is unknown to me as I have failed to meet with it in the interior of Sikkim, though it occurs in the Chumbi Valley in Tibet.

5. The Yellow-Billed Blue Magpie. *Urocissa flavirostris*
(Blyth). "Lam Puchari", Paharia.

Resident at Tonglo, Nepal-Sikkim Frontier, throughout the winter at 10,000'. One ♂ secured on Sandakphu at 11,000' on the 3-3-12. Quite a characteristic feature of the bird-life of these high altitudes, to be seen in small parties of six to eight individuals, which forage much on the ground over the steep and rocky mountain slopes. On the frontier hereabouts I did not observe this Long-tailed Pie below 6,500'. On the Semana-Mirik and Sookia-Pokharibong Ridges it comes down occasionally to 6,000', this being an extreme low limit. Sookia-Pokhari, (three miles below) ♂ ♀, 17-4-21.* Kalo-Pokhari, 10,160', 22-3-12. These birds were most persistent in paying a visit to my camp for the carcase of my specimens; they would hop about my tent door within one or two paces from my feet, and were very voracious, often taking up in their gape three or four large pieces of raw flesh before taking flight.

Lachung, 8,800'. Half a dozen birds haunted the precincts of the village in February and March, 1920. Blandford did not meet with them above 8,000' at Lachung in the autumn of 1870. This Magpie occurs in East Nepal and it is the only species of this genus I have met with in the Sikkim Himalayas.

Its call is a somewhat pleasing, yet not very pronounced, whistle. Seven specimens examined: ♂ Bill from skull, 37.5-39, av., 38.5; from nostril, 23-25, av., 24.2; wing, 185-195, av., 188.6; longest tail measurement, 385. ♀ Bill from skull, 35-37, av., 36.4; from nostril, 21.5-23, av., 22.4; wing, 178-184, av., 181.5; longest tail measurement, 405.

Soft parts:—♂ Iris, dull yellow "Mottled with brown" in this specimen.

6. The Green Magpie. *Cissa chinensis chinensis* (Bodd.).
"Dhori Koili," Paharia.

Resident in the Rungbong Valley up to 5,500' and occurs in the interior of Sikkim up to an elevation of 4,750' at all events. It has a decided preference for dense cover, but when in the open its vivid colours attract attention while on the move from one retreat to another. Its harsh, grating, "peep" "peep", quickly repeated call, however, frequently reveals its position; at times this discordant cry is replaced by a continued distinct and by no means unmelodious whistling chatter. Gopaldhara, 5,400'. Observed on the 1-2-21* in common with other resident birds, when a more congenial elevation might be expected, yet accounted for by the greater area to be covered at the cold season in search of food. "Blue" examples often seen in March. This fact can only be explained on the supposition that such birds are lacking in vigour at a period of the year when a healthy condition should be prevalent; one

such coloured individual was observed on the 24-5-14* and again on the 28-5-14*, possibly the same bird, another also on the 7-4-15*.

During the third week and onwards in July 1921, in the Rungbong and Balasan Valleys, the cherry trees were denuded of foliage with an extraordinary plague of caterpillars of the crepuscular moth *Achelura bifasciata*, one of the *Chalcosinæ*.—Family, *Zyganidæ*. A pair of these Magpies were to be seen on occasions in the early morning at Gopaldhara trifling with these blue and yellow banded larvæ, which were evidently too acrid for consumption, as even *Hierococcus sparverioïdes* was content to leave them at their repast, this being too drastic for its palate. An interesting illustration of the advantage accruing from warning colours and unpalatability amongst the Lepidoptera!

7. The Indian Tree-Pie. *Dendrocitta rufa vagabunda* (Lath.).

Distribution, as recorded by Oates, Himalayas up to 7,000'.

I have totally failed to meet with this Tree-Pie even at the lowest limits of its supposed range; it certainly *does not occur much beyond the base of the hills*, where it has been obtained at the plains level of 500' (G.E. Shaw).

In the Eastern Dooars during January 1922 an odd pair or so used to visit the neighbourhood of the Bhotan Ghat forest bungalow on the Raidak River; they were to be commonly met with two miles to the south, in the more open country, beyond the limits of the heavy forest. Only one ♀ adult in clean moulted plumage was secured 29-1-22, which was altogether paler on the back than specimens, (sex and period similar), from the same identical tract of country further to the east in Upper Assam. Notwithstanding this distribution area is applicable to *vagabunda* this specimen is clearly the typical form *D. rufa rufa* (Lath.).

8. The Himalayan Tree-pie. *Dendrocitta sinensis himalayensis* (Blyth). "Kokila", Paharia.

Commonly occurs in the Rungbong Valley and reaches an elevation of 6,000'. Noted as equally plentiful around Singhik at an elevation of 4,600' during February and March in the interior of Sikkim.

9. The Black-browed Tree-Pie. *Dendrocitta frontalis* McClell.

This species is represented in the Darjeeling Museum, but I have failed to locate this Tree-Pie; it can only be very locally distributed and entirely absent from large tracts, notwithstanding Jerdon's distribution area of 3,000'-5,000' to the contrary quoted by Oates for Sikkim. Information as to its exact distribution in the Sikkim Himalaya is desirable.

10. The Sikkim Jay. *Garrulus bispecularis interstinctus* Hartert. "Lho-Kharipho", Lepcha.

Sparingly and locally distributed. It appears to spread over a wider area on the outer ranges during the winter, but evidently occupies a *breeding range in elevation of from 7,000'-9,000'* or thereabouts.

The following records prove it descends to much lower limits on rare occasions. Kalo Pokhari, 10,160', ♀ 22-13-12. This single specimen was brought in to my camp along with several *Garrulax albogularis* by a Gurkhali shikari from the Mai ("Khola") Valley in East Nepal, having been obtained at an approximate elevation of 8,500'. Gopaldhara, 6,000', ♂ ♀ ♀ 2-11-19, obtained out of a party of six individuals. Lachung, ♀ 26-2-20. Two miles south, at an elevation of 9,000', I came across a small party of which three were noted, but failed to meet with them again in the same Rhododendron forest. Mangpu. ♂ 18-11-19, elevation 3,600'. ♀ 21-11-19, elevation 3,800'. (G.E. Shaw). These two last records are very

interesting on account of the extreme low limit reached in its wanderings. In former years obtained above Toong, *circum.* 7,000' on the Senchal-Kurseong Ridge (H.P.P. Barrett). There can be little doubt that it still occurs in this well wooded part of the district. The Mangpu records certainly refer to birds which have descended from this forest reserve. Single specimens are occasionally to be found in a representative collection from Darjeeling; as the exact locality is seldom definitely stated such examples lose in value. Information as to its present status and exact distribution is desirable and every single record is important, provided it is accompanied with full data.

Five specimens examined: Gopaldhara, ♂, Bill from skull, 30, from nostril, 19; wing, 167; tarsus, 45; tail, 145. Soft parts: iris, pale brown; orbits, cinnamon dusky-brown; tarsus, fleshy-mauve; claws, similar though darker. The stomach contained pieces of a nut of substantial texture and much sharp white gravel.

♀. Bill from skull, 30, from nostril, 19·5; wing, 165; tarsus, 45; tail, 147.

♀. Bill damaged; wing, 165; tarsus, 45; tail, 145.

Kalo Pokhari, ♀, Bill from skull, 29, from nostril, 18·5; wing, 164; tarsus, 44; tail, 145.

Lachung, ♀, Bill from skull, 30, from nostril, 19; wing, 172; tarsus, 43; tail 160.

This last specimen has not the deep tone in coloration of the other four specimens; it is paler on the forehead and crown, and has the back suffused with a vinaceous wash. The measurements almost point to a large race in the interior of Sikkim, but no definite result can be arrived at from this single specimen. Soft parts: Iris, hazel with a faint indication of an outer blue ring; tarsus, fleshy.

II. The Himalayan Nutcracker, *Nucifraga caryocatactes hemispila*. (Vig.). "Lek Bhali", Paharia.

Generally distributed, equally plentiful on the outer ranges as it is in the interior. Blanford found it rare on the outer ranges in the autumn of 1870. Resident from 9,000'-10,000'. On the Nepal Frontier it was "absent from the Pine forests in the winter" early 1912 when they were *breeding in a belt of forest below the pines*. The grating "cra" of this Nutcracker is quite a characteristic call of these high altitudes. Observed frequently around Karponang at 9,500' but the majority of the birds were below this elevation in March 1917. Above Lachung at 10,000' in March 1920 they were very noisy on the outskirts of the pine forests. I could detect no signs of breeding having actually commenced in sexing the birds obtained. Tonglo, Singile La Ridge, 10,000', ♂, 9-2-12, one of a pair, testes active, evidently an early nesting species, but this specimen is the first obtained that gave any indication of this surmise. Kalo Pokhari, 28-3-12, an adult and fully fledged youngster taken at the nest near at hand, in Nepal, at an elevation of 9,500' approx. below the pine forests, remarked upon at the time as an unusual? early date, and the single fledgling as significant of this fact, heavy falls of snow at this time. 10,000', ♀ 28-4-12, immature, in mottled plumage, showing the white, pear-shaped spots extending over the complete under surface. ♂ Adult, 23-5-12, undergoing moult, the new dark feathers on the breast are prominent. It evidently breeds at an earlier period of the year on the outer ranges than it does in the interior.

Eleven specimen examined:—all adults.

♂ Bill from skull, 46§-51·5, av., 48·9; from nostril, 34-39, av., 36·2.

♀ Bill from skull, 43§-49, av., 45·7; from nostril, 31-37·5, av., 33·5.

♂ Wing, 210-229, av., 220·5. ♀ wing, 211-220, av., 214·6.

Four ♂♂ and one ♀ show the white spot on the seventh primary; these in common with the rest are fully adult.

Soft parts.—Iris, dark brown; bill and tarsus, black.

§ The bill is worn to a chisel point in these two examples.